King County
Department of
Natural Resources and Parks
Wastewater Treatment Division

Wastewater Education Programs
Treatment Plant Tour
Pre/post trip general questions
Grades 4-8

Pre-field trip guide: Wastewater Treatment Plant Tour – Student Guide

1) Track your water usage for 1 day:
    - What activities required water?
    - Which activity(s) required the most water at the end of the day?
    - Estimate how many gallons of water you used:
    - What did you add to this water that made it 'dirty'?

2) Think about the water cycle. Is there a new water factory making new water for everyone to use?

3) You made 2 decisions every time you used water – they are important decisions - decisions that only you can make, no one else makes them for you. What are they?

4) All of the water you used was drinking water. Where did it come from?

5) Where will this water go when it leaves your house?

6) If this dirty water went directly to a lake or the Puget Sound, what might happen? Think about people, animals and the environment.

7) What is the difference between water that runs off a road, house or yard and into the storm drain (stormwater) vs. water that leaves a drain or toilet in your house (wastewater)?

8) Everything is recycled, nothing disappears. Imagine your bodies, drains and toilets are recycling bins and wastewater treatment plants are recycling centers. Pick one of the following cycles to draw or describe in writing. Make sure and include yourself and the wastewater treatment plant in the cycle.

- Water cycle
- Nutrient cycle
- Pollutant cycle
- Energy cycle

9) Predict what happens if too much water enters into the sewer system

10) Think about all of the pipes and pump stations that help move dirty water away from your home or school. How old are they? How big are they? What are they made of? What happens as these pipes get old?

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Pre-field trip guide: Wastewater Treatment Plant Tour- Teacher guide

11) Track your water usage for 1 day:

- What activities required water?
  Brushing teeth, flushing toilets, taking showers, washing hands, washing dishes, washing clothes, watering plants/yards, washing pets/cars, cooking, drinking

- Which activity(s) required the most water at the end of the day?
  Taking showers and flushing toilets, washing clothes/dishes

- Estimate how many gallons of water you used:
  80-100 per person

- What did you add to this water that made it 'dirty'?
  Dirt, germs, skin, hair (shower), trash (toilet paper), food, oils, grease (kitchen sink, garbage disposal, dishwasher), human waste, soaps/chemicals (all household cleaners, medicines taken, soaps, lotions, shampoos, cosmetics, etc), bacteria

12) Think about the water cycle. Is there a new water factory making new water for everyone to use?
  No. The water we have today was the same water we had 1 year ago, 100 years ago, and the same water we will have 100 years from now. The water you drank today was already drank by someone else and will be drank by someone else in the future.

13) You made 2 decisions every time you used water – they are important decisions - decisions that only you can make, no one else makes them for you. What are they?
  - *How much water to use*
  - *What to put in the water (how dirty to make it, what to throw away, how much soap to use and what type of soap)*

14) All of the water you used was drinking water. Where did it come from?

Cedar River Watershed (for most King County residents) or groundwater

15) Where will this water go when it leaves your house?
To a wastewater treatment plant, and eventually back to the environment

16) If this dirty water went directly to a lake or the Puget Sound, what might happen? Think about people, animals and the environment.
- *People and animals would get sick because of bacteria or chemicals. There wouldn't be enough oxygen for all of the fish (dissolved oxygen)*
- *People couldn't swim in the water.*
- *Fish and shellfish would be polluted and not safe to eat.*

17) What is the difference between water that runs off a road, house or yard and into the storm drain (stormwater) vs. water that leaves a drain or toilet in your house (wastewater)?
- *Stormwater – goes directly into a water body (lake, river or Puget Sound) untreated – pollutants coming from streets, cars, lawns and gardens and pets*
- *Wastewater – goes to a treatment plant for treatment before entering the Puget Sound – pollutants coming from inside homes, businesses from drains and toilets*

18) Everything is recycled, nothing disappears. Imagine your bodies, drains and toilets are recycling bins and wastewater treatment plants are recycling centers. Pick one of the following cycles to draw or describe in writing. Make sure and include yourself and the wastewater treatment plant in the cycle.

- Water cycle
  - *Rain, drinking water, people use the water, the water goes to a wastewater treatment plant and is cleaned, the water is sent back to the environment, the water evaporates into the sky, condenses in the clouds, rains again for people to use for drinking water.*
- Nutrient cycle
  - *You eat food, your body digests it, you go to the bathroom, the organic solid nutrients go to the treatment plant, bacteria and machines digest the solids, the nutrients are turned into fertilizer, then sent to the soil to grow more plants for people to use.*
- Pollutant cycle

- *People use chemicals and toxins. They end up back in the air or water or soil. If they go down a drain with water they will go to a treatment plant. The good bacteria at the treatment plant clean the water but don't know what to do with the toxins. The partially treated chemicals then go to the soil as fertilizer or the water with clean water. If they go to the soil they can end up back in our food, if they go to the water they can end up in crabs, clams or fish and then when we eat them the chemicals can come back to us again.*

- Energy cycle
  - *You cook and eat food. You go to the bathroom and send your human waste to the treatment plant. The treatment plant treats the human waste and turns the organic solids into fertilizer using bacteria. Thos bacteria produce methane gas. Some treatment plants send the treated methane gas back to homes and business for cooking more food or heating homes.*

19) Predict what happens if too much water enters into the sewer system
  - *Overflows, flooding*

20) Think about all of the pipes and pump stations that help move dirty water away from your home or school. How old are they? How big are they? What are they made of? What happens when they get old?
  - *1-100 years old*
  - *4 in diameter to 14ft diameter*
  - *Wood, brick, steel, concrete, plastic*
  - *Break, crack, corrode – they don't work as well and can't help move the dirty water as easily.*